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EXAMINER	
CUTLER, ALBERT H	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/811,019	VANBREE, KEN
	Examiner	**Art Unit**
	ALBERT H. CUTLER	2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 November 2008.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-12 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-12 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This office action is responsive to communication filed on November 26, 2008. Claims 1-12 are pending in the application and have been examined by the Examiner.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 26, 2008 has been entered.

Response to Arguments

3. Applicant's arguments with respect to claims 1-12 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

4. Claims 4, 7 and 11 are objected to because of the following informalities: Lack of clarity and precision.

5. Claim 4 recites "as that position **form** which the reference image is obtained" and claim 7 recites "extracting reference points **form** more than one image". The Examiner believes claim 4 should read "as that position **from** which the reference image is obtained" and claim 7 should read "extracting reference points **from** more than one image" so as to improve clarity, and the Examiner will interpret claims 4 and 7 as such. Appropriate correction is required.

Claim 11 recites "an imaging device **adapted for** coupling to an image capture device". It has been held that the recitation that an element is "adapted for" performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In re Hutchison, 69 USPQ 138. The Examiner recommends removing the language "adapted for". Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1, 2, 4-9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashima et al. (US 5,521,843) in view of Habibi et al. (US 6,816,755).

Consider claim 1, Hashima et al. teach:

An imaging system(figure 1) to reposition an image capture device(camera, 20) in a position relative to a subject of interest according to six degrees of freedom(column 7, lines 38-65) as preserved in association with a reference image("image produced when the target mark 10 is in the target position", column 16, lines 9-16) of the subject of interest(see figure 1), comprising:

an image capture device(20, figure 1);

a position apparatus(robot, 30) on which the image capture device(20) is mounted(see figure 1), operable to orient the image capture device(20) relative to a subject of interest according to six degrees of freedom(column 7, lines 38-65);

a reference image of the subject of interest("image produced when the target mark 10 is in the target position", column 16, lines 9-16), wherein said reference image is based on an initial acquired image of said subject of interest (In Hashima et al., the subject of interest is a target mark (10). A reference image of the target mark (10) is obtained (i.e. initially acquired) when the target mark (10) is in the target position. See column 15, line 62 through column 16, line 16.), identifying fixed points in said reference image (See column 16, lines 17-36. A white triangle (12) and a black circle (11) are identified as fixed points in the reference image, which fixed points are used to determine a shift along six degrees of freedom. See figures 2-4 and 28-30.), and wherein said reference image comprises a computational model generated from an initial image of the subject of interest (The reference image comprises a computational model, as it is the basis of a computation of a shift from a target position, column 16, lines 8-57.).

a computational device(50, 60) coupled to the position apparatus(30, see figure 1), such computational device(50, 60) capable of receiving images from the image capture device(20) and receiving the reference image, performing a comparison, and communicating adjustments to reposition the image capture device(20) along any of six degrees of freedom(A current image is compared with a reference image, a difference is calculated, this difference is sent to the robot controller(60), and the robot controller(60) controls the robot(30) to position the camera(20) such that the current image position is the same as the reference image position. See column 16, line 9 through column 19, line 26.).

However, Hashima et al. teach that the reference image is of a target mark, and thus is not acquired of a random or arbitrary scene of interest.

Habibi et al. similarly teaches of an imaging system(figure 1) to reposition an imaging device(camera, 16). Habibi et al. similarly teaches capturing a reference image of a subject, which reference image comprises a computational model(See figure 6, column 6, lines 5-22. An image of an object is captured and at least 6 features in the object are selected to create a computational model containing the 3D position of the at least 6 features.). Habibi et al. also teaches of communicating adjustments to reposition the image capture device(See figure 7, column 8, lines 1-65. A robot movement is calculated which enables the camera to be positioned in the same position as in training(i.e. as it was during the capture of the initial image) with reference to the object.).

However, in addition to the teachings of Hashima et al., Habibi et al. teaches that the reference image is acquired of a random or arbitrary scene of interest(See figure 4, column 6, lines 6-14, column 8, line 65. The 6 features selected from the reference image are normal features of the object, which features may comprise edges, holes, corners or blobs. Thus a target mark such as that taught by Hashima et al. is not required and features can be extracted from the object being photographed(i.e. acquired of a random or arbitrary scene of interest).).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to enable the imaging system taught by Hashima et al. to acquire a reference image of a random or arbitrary scene of interest and use features extracted from said reference image for the positional adjustment computation as taught by Habibi et al. for the benefit of reducing the number of parts by eliminating the target mark while still maintaining a high level of accuracy and repeatability(Habibi et al., column 1, lines 40-45).

Consider claim 2, and as applied to claim 1 above, Hashima et al. further teach that the communication of position adjustments is via signals to the positional apparatus(30) from the computational device(50, 60, column 7, lines 45-65, column 18, line 47 through column 19, line 24).

Consider claim 4, Hashima et al. teach:

A method for repositioning an image capture device(20) relative to a subject of interest(1) according to six degrees of freedom(column 15, line 58 through column 19, line 26, figure 29) comprising the steps of:

a) initializing an imaging system, wherein initializing includes the steps of:

a. 1) obtaining a reference image of the subject of interest("image produced when the target mark 10 is in the target position", column 16, lines 9-16), wherein said reference image is acquired from and based on an initial acquired image of said subject of interest(In Hashima et al., the subject of interest is a target mark (10). A reference image of the target mark (10) is obtained (i.e. initially acquired) when the target mark (10) is in the target position. See column 15, line 62 through column 16, line 16.), identifying fixed points in said reference image (See column 16, lines 17-36. A white triangle (12) and a black circle (11) are identified as fixed points in the reference image, which fixed points are used to determine a shift along six degrees of freedom. See figures 2-4 and 28-30.), and wherein the reference image comprises a computational model generated from an initial image of said subject of interest (The reference image comprises a computational model, as it is the basis of a computation of a shift from a target position, column 16, lines 8-57.), wherein said reference image includes multiple reference points in 3-dimensional space(See column 7, lines 45-48, column 7, line 66 through column 8, line 17, column 15, line 58 through column 16, line 8, figures 2, 3, and 4. A reference image is obtained of a three-dimensional target mark(10).);

a.2) repositioning an image capture device relative to the subject of interest, where such repositioning uses six degrees of freedom(column 16, lines 9-57);

b) imaging the subject of interest(column 16, lines 9-16);

c) computing by means of a complex program run a single time (Hashima et al. teaches a complex program involving an image processor in column 14, line 61 through column 15, line 37.) the difference between the reference image of the subject of interest and the image capture device image(column 16, line 9 through column 18, line 30, note especially column 16, lines 9-16);

d) refining the position of the image capture device(20) so that the image capture device(20) is in the same position relative to the subject of interest as that position from which the reference image was obtained, where such refining the position of the image capture device occurs along six degrees of freedom(column 16, lines 9-16, column 18, line 31 through column 19, line 26).

However, Hashima et al. teach that the reference image is of a target mark, and thus is not acquired of a random or arbitrary scene of interest.

Habibi et al. similarly teaches of an imaging system(figure 1) to reposition an imaging device(camera, 16). Habibi et al. similarly teaches capturing a reference image of a subject, which reference image comprises a computational model(See figure 6, column 6, lines 5-22. An image of an object is captured and at least 6 features in the object are selected to create a computational model containing the 3D position of the at least 6 features.). Habibi et al. also teaches of communicating adjustments to reposition the image capture device(See figure 7, column 8, lines 1-65. A robot movement is calculated which enables the camera to be positioned in the same position as in

training(i.e. as it was during the capture of the initial image) with reference to the object.).

However, in addition to the teachings of Hashima et al., Habibi et al. teaches that the reference image is acquired of a random or arbitrary scene of interest(See figure 4, column 6, lines 6-14, column 8, line 65. The 6 features selected from the reference image are normal features of the object, which features may comprise edges, holes, corners or blobs. Thus a target mark such as that taught by Hashima et al. is not required and features can be extracted from the object being photographed(i.e. acquired of a random or arbitrary scene of interest).).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to enable the imaging system taught by Hashima et al. to acquire a reference image of a random or arbitrary scene of interest and use features extracted from said reference image for the positional adjustment computation as taught by Habibi et al. for the benefit of reducing the number of parts by eliminating the target mark while still maintaining a high level of accuracy and repeatability(Habibi et al., column 1, lines 40-45).

Consider claim 5, and as applied to claim 4 above, Hashima et al. teach of a method for repositioning an image capture device(20) relative to a subject of interest(1) according to six degrees of freedom(column 15, line 58 through column 19, line 26, figure 29, claim 4 rationale). Hashima et al. also teach of calculating the position of the 6 degrees of freedom based on a three-dimensional target(see claim 4 rationale).

However, Hashima et al. do not explicitly teach the step of generating a three dimensional model of the subject of interest through selection of reference points in the subject of interest.

Habibi et al. additionally teaches the step of generating a three dimensional model of the subject of interest through selection of reference points in the subject of interest(See column 6, lines 5-22. Reference points comprising edges, holes, corners and blobs are selected and a three dimensional model indicating the 3D position of the object features is generated.).

Consider claim 6, and as applied to claim 4 above, Hashima et al. further teach that the reference image is obtained after fixed reference points have been selected in the subject of interest(See figures 2, 3, and 4, column 7, line 66 through column 8, line 17. A target mark(10) having fixed reference points is placed in the image and captured with the reference image.).

Consider claim 7, and as applied to claim 4 above, Hashima et al. does not explicitly teach extracting points from more than one subject of interest.

However, Habibi et al. teaches that initializing includes extracting reference points from more than one image of the subject of interest representing more than one camera center(See column 1, lines 31-34. Multiple cameras and thus multiple images can be used to select target points.).

Consider claim 8, and as applied to claim 4 above, Hashima et al. further teach that time has elapsed between the initialization process and the repositioning of the image capture device(Column 15, line 62 through column 16, line 16. A reference image is obtained with the target mark(10) in the target position, and later compared to a recent image to reposition the camera.).

Consider claim 9, and as applied to claim 4 above, Hashima et al. further teach that the computation of position is communicated to an automatic position correction apparatus(robot, 30, figure 1, column 7, lines 38-56, column 18, line 36 through column 19, line 24).

Consider claim 11, Hashima et al. teach:

An apparatus(30, figure 1) for positioning an imaging device(20) and adapted for coupling to an image capture device(20, see figure 1) and where such apparatus(30) is positions said image capture device(20) along six degrees of freedom(column 7, lines 38-65), such that the positioning of the image capture device(20) is controllable and said apparatus(30) orients the image capture device(20) relative to a subject of interest using six degrees of freedom to orient the image capture device(column 7, lines 38-65), and wherein said positioning of said image capture device relies on a reference image of the subject of interest(“image produced when the target mark 10 is in the target position”, column 16, lines 9-16), wherein said reference image is based on an initial acquired image of said subject of interest (In Hashima et al., the subject of interest is a

target mark (10). A reference image of the target mark (10) is obtained (i.e. initially acquired) when the target mark (10) is in the target position. See column 15, line 62 through column 16, line 16.), identifying fixed points in the reference image (See column 16, lines 17-36. A white triangle (12) and a black circle (11) are identified as fixed points in the reference image, which fixed points are used to determine a shift along six degrees of freedom. See figures 2-4 and 28-30.), and the reference image comprises a computational model generated from said initial image of the subject of interest (The reference image comprises a computational model, as it is the basis of a computation of a shift from a target position, column 16, lines 8-57.).

However, Hashima et al. teach that the reference image is of a target mark, and thus is not acquired of a random or arbitrary scene of interest.

Habibi et al. similarly teaches of an imaging system(figure 1) to reposition an imaging device(camera, 16). Habibi et al. similarly teaches capturing a reference image of a subject, which reference image comprises a computational model(See figure 6, column 6, lines 5-22. An image of an object is captured and at least 6 features in the object are selected to create a computational model containing the 3D position of the at least 6 features.). Habibi et al. also teaches of communicating adjustments to reposition the image capture device(See figure 7, column 8, lines 1-65. A robot movement is calculated which enables the camera to be positioned in the same position as in training(i.e. as it was during the capture of the initial image) with reference to the object.).

However, in addition to the teachings of Hashima et al., Habibi et al. teaches that the reference image is acquired of a random or arbitrary scene of interest(See figure 4, column 6, lines 6-14, column 8, line 65. The 6 features selected from the reference image are normal features of the object, which features may comprise edges, holes, corners or blobs. Thus a target mark such as that taught by Hashima et al. is not required and features can be extracted from the object being photographed(i.e. acquired of a random or arbitrary scene of interest).).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to enable the imaging system taught by Hashima et al. to acquire a reference image of a random or arbitrary scene of interest and use features extracted from said reference image for the positional adjustment computation as taught by Habibi et al. for the benefit of reducing the number of parts by eliminating the target mark while still maintaining a high level of accuracy and repeatability(Habibi et al., column 1, lines 40-45).

Consider claim 12, and as applied to claim 11 above, Hashima et al. further teach that the positioning of the image capture device is automated(The positioning is done by a mechanical robot(30), column 7, lines 38-65, figure 1.).

9. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashima et al. in view of Habibi et al. as applied to claims 1 and 4 above, and further in view of Verghese(US 7,038,709).

Consider claim 3, and as applied to claim 1 above, Hashima et al. teach of an imaging system to reposition an image capture device in six degrees of freedom(see claim 1 rationale). However, the combination of Hashima et al. and Habibi et al. does not explicitly teach of a user interface for communicating positional adjustments.

Verghese is similar to Hashima et al. in that Verghese teaches of an imaging system(figures 1-3) to reposition an image capture device(Camera, 16) in a position relative to a subject of interest as that of a reference image of the subject of interest, comprising an image capture device(camera, 16), a position apparatus(figure 2) on which the image capture device(16) is mounted(see figure 3a), operable to orient the image capture device relative to a subject of interest(See column 5, lines 31-45. The position apparatus orients the image capture device in order to track the motion of the subject of interest.), a reference image of the subject of interest(See figure 12, step 508, column 18, lines 8-25. A reference image is obtained to determine current camera orientation.), a computational device(44, figure 1) coupled to the position apparatus(figure 1), such computational device(44) capable of receiving images from the image capture device(16) and of receiving the reference image(column 5, lines 56-67), performing a comparison(The image processing component(44) receives an image, determines the location of a certain color using a color tracking algorithm, centers that location on the camera field of view, compares subsequent frames to determine if the position of the predetermined color has moved from the center, and repositions the imaging device so that the predetermined color is re-centered. See column 5, line 56

through column 7, line 12, figure 12, column 17, line 8 through column 19, line 6.), and communicating position adjustments to reposition the image capture device(column 6, lines 37-55).

However, in addition to the teachings of Hashima et al. and Habibi et al., Verghese teaches that the communication of position adjustments is by means of positional adjustment data conveyed by means of a user interface(column 5, lines 47-55, column 7, lines 24-35).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to include a user interface to communicate position adjustments as taught by Verghese in the imaging system to reposition an image capture device as taught by the combination of Hashima et al. and Habibi et al. for the benefit creating a more versatile device by allowing the user to control the size and quality of a displayed image, and the ability to override the image tracking system in favor of user positioning when desired(Verghese, column 5, lines 47-55).

Consider claim 10, and as applied to claim 4 above, Hashima et al. teach of an imaging system to reposition an image capture device in six degrees of freedom(see claim 4 rationale). However, the combination of Hashima et al. and Habibi et al. does not explicitly teach of a user interface for communicating position.

Verghese is similar to Hashima et al. in that Verghese teaches of an imaging system(figures 1-3) to reposition an image capture device(Camera, 16) in a position relative to a subject of interest as that of a reference image of the subject of interest,

comprising an image capture device(camera, 16), a position apparatus(figure 2) on which the image capture device(16) is mounted(see figure 3a), operable to orient the image capture device relative to a subject of interest(See column 5, lines 31-45. The position apparatus orients the image capture device in order to track the motion of the subject of interest.), a reference image of the subject of interest(See figure 12, step 508, column 18, lines 8-25. A reference image is obtained to determine current camera orientation.), a computational device(44, figure 1) coupled to the position apparatus(figure 1), such computational device(44) capable of receiving images from the image capture device(16) and of receiving the reference image(column 5, lines 56-67), performing a comparison(The image processing component(44) receives an image, determines the location of a certain color using a color tracking algorithm, centers that location on the camera field of view, compares subsequent frames to determine if the position of the predetermined color has moved from the center, and repositions the imaging device so that the predetermined color is re-centered. See column 5, line 56 through column 7, line 12, figure 12, column 17, line 8 through column 19, line 6.), and communicating position adjustments to reposition the image capture device(column 6, lines 37-55).

However, in addition to the teachings of Hashima et al. and Habibi et al., Verghese teaches that the computation of position is communicated to the user through an interface(column 5, lines 47-55, column 7, lines 24-35).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to include a user interface to communicate the computation

of position as taught by Verghese in the imaging system to reposition an image capture device as taught by the combination of Hashima et al. and Habibi et al. for the benefit creating a more versatile device by allowing the user to control the size and quality of a displayed image, and the ability to override the image tracking system in favor of user positioning when desired(Verghese, column 5, lines 47-55).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. Pryor (US 6,044,183) teaches of determining a camera orientation with respect to an object, and re-orienting the camera with 6 degrees of freedom(See abstract, column 4, lines 43-58, column 5, lines 13-28). Pryor also teaches that multiple views and multiple cameras can be used to determine the target location(column 9, lines 11-15).

12. Pryor (US 4,753,569) teaches of determining a camera orientation with respect to an object, and re-orienting the camera with 6 degrees of freedom(See abstract, figure 2, column 4, lines 18-48).

13. Pryor (US 4,769,700) teaches of determining a camera orientation with respect to an object, and re-orienting the camera with 6 degrees of freedom(See abstract, figure 11, column 14, lines 21-30, column 11, lines 18-23.).

14. Eian et al. (US 7,277,599) teaches of recovering a 3D position of an object with respect to a camera(See abstract, figures 4 and 6).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALBERT H. CUTLER whose telephone number is (571)270-1460. The examiner can normally be reached on Mon-Thu (9:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AC

/Sinh N Tran/
Supervisory Patent Examiner, Art Unit 2622